

## Scientific Note

### THE DISTRIBUTION OF AQUATIC HETEROPTERA (NOTONECTIDAE) IN HAWAII

Lentic habitats on the main Hawaiian islands were sampled for hemipterans, particularly backswimmers (Heteroptera: Notonectidae), during Jul and Aug 1991 and Aug 1992. The primary habitats were ponds, stock troughs (concrete and metal), and cisterns associated with stock troughs. Sampling was conducted on Hawaii, Oahu, and Maui in 1991 and 1992, and on Kauai in 1992. During the course of the sampling effort, three species of notonectids were collected, two previously known in Hawaii and a single specimen of a genus that had not been reported for the State and the Western Hemisphere. This latter specimen has since been reported in the literature (Polhemus, D. A. 1995. Bishop Museum Occasional Papers, 42: 42-43).

Of the two species of notonectids that had been recorded from the state, *Buenoa pallipes* (Fabr.) was recorded around the turn of the century (Zimmerman, E. C. 1948. Insects of Hawaii. Volume 3: Heteroptera. University of Hawaii), whereas *Notonecta indica* L. is far more recent. This was the first collection of the third species, *Anisops kuroiuae* Matsumura, in the Hawaiian Islands. It is entirely possible that these species have colonized the islands as the result of human activities, perhaps as eggs in aquatic plants used in the aquarium trade. Even so, all but *A. kuroiuae* have successfully exploited available still-water habitats on all major islands surveyed. In their successful colonization of various islands after the initial event, man-aided or not, they owe no small debt to the presence of live stock. Most of the localities where notonectids were found in 1991 and 1992 were either ponds that had been augmented to hold more water for cattle or metal/concrete/plastic stock troughs.

The single male specimen of *A. kuroiuae* was collected on Maui in 1991 (Polhemus 1995) and is notable as it is the first confirmed record for the Western Hemisphere. The recorded distribution of this species extends from India through Burma, mainland China, Taiwan, the Philippines, Iriomote Island, and Okinawa Island (Brooks, G. T. 1951. Univ. Kansas Sci. Bull., 34: 301-519). Brooks (1951) reports that this genus is restricted to the Eastern Hemisphere, with one "somewhat questionable" record from Unalaska, the only previous record from the Western Hemisphere. It is impossible to tell if this record of *Anisops* from Hawaii represents a colonization or a human mediated introduction. In either event, a single male specimen was found and preserved in alcohol. Since this specimen was collected, others have collected additional specimens of *Anisops* in two habitats on the island of Lanai (D. A. Polhemus, personal communication).

*Notonecta indica* was collected on the islands of Hawaii, Oahu, and Maui in 1991 and 1992 (Polhemus 1995). None was found on Kauai in 1992. This species was found in natural ponds and man-made habitats (metal or concrete stock troughs). This species was abundant on the island of Hawaii in 1991 as hundreds were observed in several ponds. These ponds were dry in 1992, but 8 adults and

numerous nymphs were collected from another pond not observed in 1991. Five adults and 50 nymphs were taken from two stock troughs on Oahu in 1991. One of the troughs remained in 1992 and numerous adults were observed. Numerous stock troughs were sampled on Maui, west and south of Haleakala National Park, each with adults and nymphs in both 1991 and 1992.

*Buenoa pallipes* was collected on the islands of Hawaii in 1991, Oahu and Maui in 1991 and 1992, and Kauai in 1992 (Polhemus 1995). On the island of Hawaii, this species was found with *N. indica* in only one pond. Even though numerous *Notonecta* were found in the stock troughs on this island, no *Buenoa* were found in this habitat. This species was found in two locations on Oahu, near Puu O Mahukona Heian State Monument, and Makakilo. The solitary specimen near the Monument was collected in a shallow muddy pool just below the road from the Monument. On Maui, specimens were collected from numerous stock tanks. Aquatic habitats on Kauai were sampled only in 1992, and only *Buenoa* specimens were found.

The solitary specimen of *A. kuroiuae* was collected in a concrete stock trough on Maui along with 10 specimens of *N. indica*. The head and pronotum are deposited in the entomological collection of the Bishop Museum, Honolulu as a voucher specimen. The remainder of the specimen was used to obtain DNA for molecular systematic studies of the Notonectidae.

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